

# Lower Lower Miocene Fan 1 Play

LM1 F1, #2681

*Lenticulina hansenii*

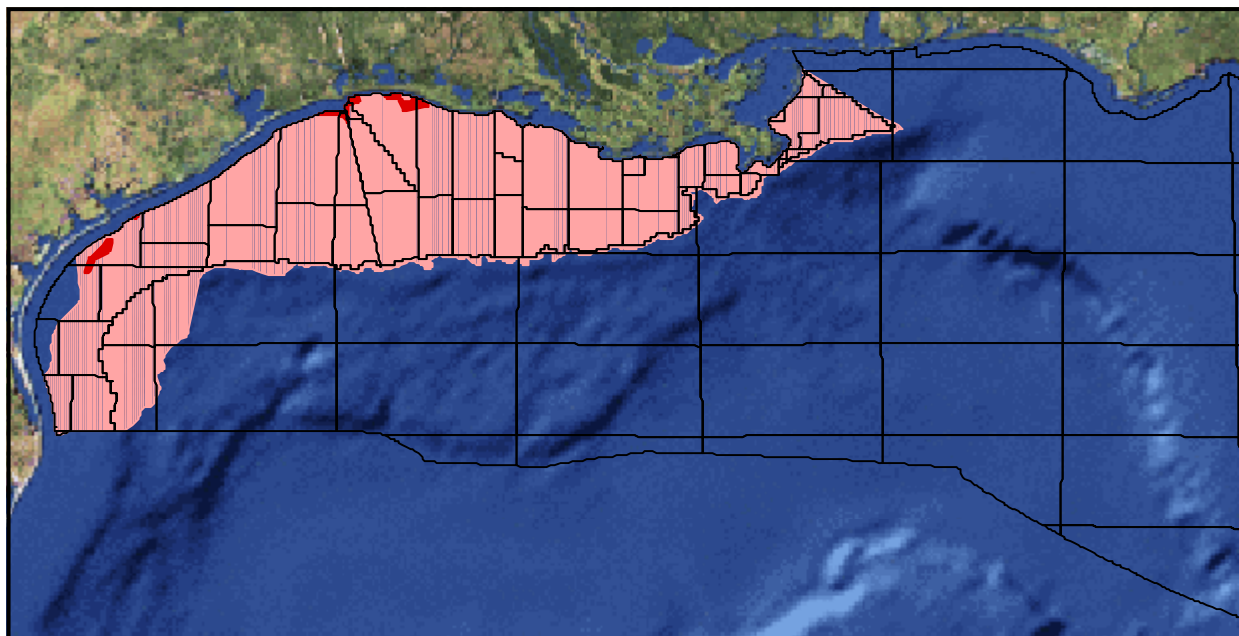


Figure 339. LM1 F1 map showing location of play. Play limit shown in light red; hydrocarbon limit shown in dark red.

## Overview

The Lower Lower Miocene Fan 1 Play (LM1 F1) contains reserves of 2,830.921 Bcfg and 20.996 MMbo (524.719 MMBOE) in 52 sands in 18 fields. Comparing the 15 F1 fan plays in the GOM, LM1 F1 ranks third in gas reserves (11%). The play extends continuously from the South Padre Island to Destin Dome Area ([Figure 339](#)).

## Description

LM1 F1 is defined by (1) a deep-sea fan depositional style representing sediments deposited basinward of the LM1 shelf edge, (2) an extensional structural regime with salt-withdrawal basins and extensive listric, growth faulting rooting into salt detachments on the modern GOM shelf, and (3) the LM1 Chronozone, the top of which is defined by the *Lenticulina hansenii* biozone ([Figure 8](#)).

LM1 F1 extends continuously from the South Padre Island Area offshore Texas, along and updip from the modern GOM shelf edge to the west-central Destin Dome Area east of the modern Mississippi River Delta ([Figure 339](#)). LM1 F1 comprises

two separate areas of hydrocarbon discoveries in the Federal OCS: (1) a western area that includes the Mustang Island and Matagorda Island Areas offshore Texas and (2) an eastern area that includes the High Island Area offshore Texas eastward to the East Cameron Area offshore Louisiana.

Depositional systems included the North Padre Delta System in the southern Texas area and the Calcasieu Delta System along the Texas-Louisiana border (Galloway et al., 1986). No aggradational or retrogradational sediments are identified for the LM1 Chronozone, presumably because the delta systems had prograded only far enough basinward through LM1 time to deposit progradational and deep-sea fan sediments in the Federal OCS.

## Play Limits

LM1 F1 extends onshore in an updip direction, except in the Mustang Island to southwestern Matagorda Island Area, where the play is limited by the LM1 shelf edge and grades into the sediments of the Lower Lower Miocene Progradational Play (LM1 P1). To the northeast, the play onlaps the lower Cretaceous carbonate slope. The play continues to

the southwest into onshore Texas and Mexican national waters. Downdip, LM1 F1 is limited by the Lower Lower Miocene Fan 2 Play (LM1 F2) (Lore et al., 2001).

## Depositional Style

LM1 F1 is characterized by deep-sea fan systems deposited basinward of the LM1 shelf edge. Component facies include channel/levee complexes, sheet-sand lobes, interlobe/fringe sediments, and slump sediments that were deposited on the LM1 upper and lower slope, in topographically low areas between salt structure highs, and abyssal plain. These deep-sea fan systems are often overlain by thick shale intervals representative of zones of sand bypass on the shelf, or sand-poor zones on the slope.

The LM1 F1 sequence is well over 7,000 ft thick. Individual pay sands range in thickness from about 10 to over 200 ft and are often stacked to form sand-rich sequences over 1,000 ft thick. Interbedded shales are, at the most, usually tens of feet thick. Sands often exhibit a sharp-base and upward-coarsening log character indicative of sheet-sand lobe progradation. Seen also on well logs are sharp-based, blocky to upward-fining sands indicative of channel fill/abandonment in proximal-fan areas. Thinner sands (a few tens of feet thick), interstratified with shales and having a spiky log signature, suggest more distal interlobe/fringe deposition. Marine shales approximately 500-1,500 ft thick overlie these deep-sea fan packages.

## Structural Style

The majority of fields in LM1 F1 are structurally associated with normal faults. Other less common structures are associated with anticlines, growth faults with rollover anticlines, shale diapirs with traps on the flanks of the diapir or in sediment drape over the diapir, and rotational-s slump blocks.

## Quantitative Attributes

On the basis of reserves calculations, LM1 F1 contains 96% gas and 4% oil. The 52 sands in the play comprise 85 reservoirs, of which 82 are nonassociated gas and 3 are undersaturated oil. All reserves are proved and estimated to be 2,830.921 Bcfg and 20.996 MMbo (524.719 MMBOE) (Table 163). These reserves account for 97% of the reserves for the LM1 Chronozone.

	No. of Sands	Oil (MMbbl)	Gas (Bcf)	BOE (MMbbl)
Proved	52	20.996	2,830.921	524.719
Cum. production	48	15.748	2,240.659	414.442
Remaining proved	23	5.248	590.262	110.277
Unproved	0	0.000	0.000	0.000

Table 163. LM1 F1 reserves and cumulative production.

Cumulative production from LM1 F1 totals 2,240.659 Bcfg and 15.748 MMbo (414.442 MMBOE) from 48 sands in 17 fields. This production accounts for 98% of the LM1 Chronozone's total production. Remaining proved reserves in the play are 590.262 Bcfg and 5.248 MMbo (110.277 MMBOE) in 23 sands in 11 fields.

Table 164 summarizes that water depths of the fields in LM1 F1 range from 17-121 ft, and play interval discovery depths vary from 10,924-18,250 ft, subsea. Additionally, porosity and water saturation range from 16-31% and 16-57%, respectively.

52 Sands	Min	Mean	Max
Water depth (ft)	17	48	121
Subsea depth (ft)	10,924	13,682	18,250
Reservoirs per sand	1	2	10
Porosity	16%	23%	31%
Water saturation	16%	34%	57%

Table 164. LM1 F1 sand attributes. Values are volume-weighted averages of individual reservoir attributes.

## Exploration History

LM1 F1 has a 44-year history of discoveries (Figure 340). The first sand in the play was discovered in 1955 in the West Cameron 40 Field. The

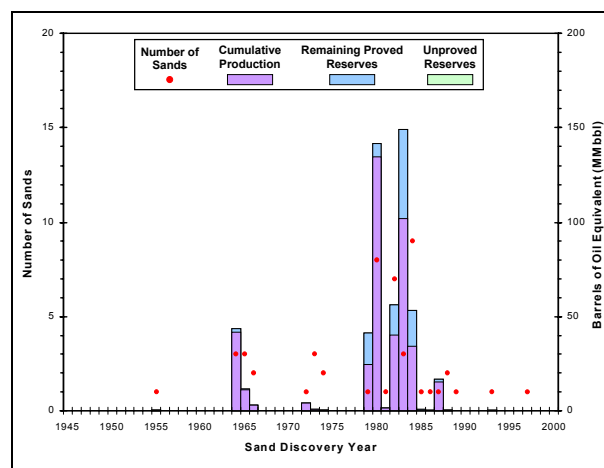


Figure 340. LM1 F1 exploration history graph showing reserves and number of sands discovered by year.

maximum number of sands discovered in any year occurred in 1984 with 9 sands from four fields. However, the maximum yearly reserves of 149.036 MMBOE were added in 1983 with the discovery of 3 sands from two fields. In fact, 148.531 MMBOE of that maximum yearly reserves is from the largest sand discovery in the play in the Matagorda Island 623 Field (Figure 341). One other 100-plus MMBOE sand was discovered in 1980 in the Matagorda Island 668 Field. Sand discoveries peaked from 1980 to 1985 when 28 of the play's 52 sands were found, which added 77% of the play's reserves (Figure 340). The mean sand size for the play is 10.091 MMBOE. One sand, with reserves estimated at 0.136 MMBOE, has been discovered in the play since the first Atlas database cutoff of January 1, 1995.

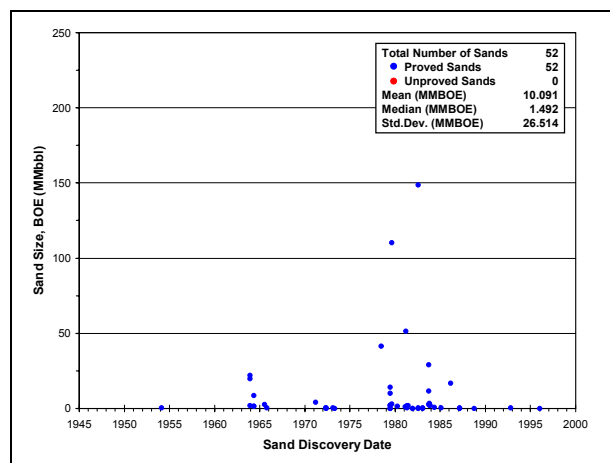


Figure 341. LM1 F1 sand discovery graph showing the size of sands discovered by year.

## Production History

LM1 F1 has a 36-year history of production (Figure 342). Production from the play started in 1959, but ceased in 1962 as the LM1 F1 reservoir in West Cameron 40 Field became depleted. With the discovery of the West Cameron 17 Field, production began again in 1966, but ceased during 1970. With a number of discoveries in the 1970's and 1980's, production again increased and peaked in 1989. Since then, LM1 F1 oil production has remained fairly steady, but gas production has declined by slightly less than half.

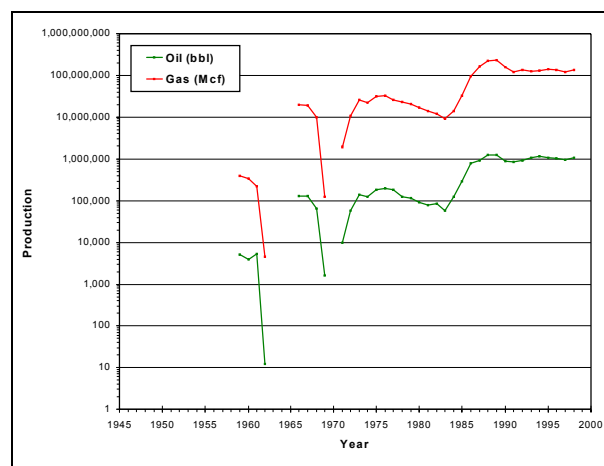


Figure 342. LM1 F1 production graph showing oil and gas production by year.